

Attorney Docket No. MIO 0020 VA (97-0198.02)
Serial No. - 09/510,828

Please amend claims 29, 30 and 31.

Please also cancel claims 36 and 73.

29. (Twice Amended) An apparatus for attaching to a plurality of contacts of a semiconductor, said apparatus comprising:

an interconnect structure comprising a plurality of conductors patterned to match corresponding ones of said plurality of contacts of said semiconductor; and

an attachment device comprising a spring element including an elastic member comprised of a first elastomeric material and a conductive member, said conductive member comprising a plurality of conductive particles interspersed within said first elastomeric material and selected from the group consisting of gold, aluminum, nickel, silver, stainless steel, and alloys thereof, said attachment device arranged to press said semiconductor between said spring element and said interconnect structure to provide an electrical connection between said plurality of conductors and said corresponding ones of said plurality of contacts.

30. (Amended) The apparatus of claim 29, wherein said conductive member comprises a plurality of conductive particles adhesively applied to at least one surface of said first elastomeric material.

31. (Amended) The apparatus of claim 29, wherein said plurality of conductive particles are interspersed within said elastomeric member so as to define a layer of conductive material on at least one surface of said first elastomeric material.

37. The apparatus of claim 29, wherein said semiconductor is electrically biased through said spring element.

Attorney Docket No. MIO 0020 VA (97-0198.02)
Serial No. - 09/510,828

38. The apparatus of claim 29, wherein said semiconductor comprises a semiconductor die.

39. The apparatus of claim 29, wherein said semiconductor comprises a semiconductor die formed within a semiconductor package.

40. The apparatus of claim 39, wherein said semiconductor package comprises a package selected from the group consisting of a chip-scale package, a ball grid array, a chip-on-board, a direct chip attach, and a flip-chip.

44. An apparatus for attaching to a plurality of contacts of a semiconductor, said apparatus comprising:

an interconnect structure comprising a plurality of conductors patterned to match corresponding ones of said plurality of contacts of said semiconductor; and

an attachment device arranged to press said semiconductor against said interconnect structure to provide an electrical connection between said plurality of conductors and said corresponding ones of said plurality of contacts, said attachment device comprising a spring element including a conductive member and a first elastic member comprised of a first elastomeric material having first force transfer characteristics, said first elastic member having a plurality of holes formed therein such that said spring element has overall force transfer characteristics different from said first force transfer characteristics.

45. The apparatus of claim 44, wherein said spring element further comprises an elastic member comprised of a second elastomeric material having second force transfer characteristics, said second elastic member positioned in at least one of said plurality of holes formed in said first elastic member such that said overall force

Attorney Docket No. MIO 0020 VA (97-0198.02)
Serial No. - 09/510,828

transfer characteristics are different from said first and second force transfer characteristics.

46. The apparatus of claim 44, wherein said spring element further comprises a plurality of second elastic members positioned in a plurality of said plurality of holes in said first elastic member.

47. The apparatus of claim 44, wherein said conductive member comprises a plurality of conductive particles.

50. An apparatus for attaching to a plurality of contacts of a semiconductor, said apparatus comprising:

an interconnect structure comprising a plurality of conductors patterned to match corresponding ones of said plurality of contacts of said semiconductor; and

an attachment device arranged to press said semiconductor against said interconnect structure to provide an electrical connection between said plurality of conductors and said corresponding ones of said plurality of contacts, said attachment device comprising a spring element including an elastic member comprised of a conductive member and an elastomeric material having first force transfer characteristics, said first elastic member having at least one hole formed therein such that said spring element has overall force transfer characteristics different from said first force transfer characteristics, said elastic member being shaped so as to engage an outer edge of said semiconductor such that a force applied by said attachment device as said semiconductor is pressed by said attachment device against said interconnect structure is substantially uniform around said semiconductor.

Attorney Docket No. MIO 0020 VA (97-0198.02)
Serial No. - 09/510,828

51. The apparatus of claim 50, wherein said conductive member comprises a plurality of conductive particles.

54. An apparatus for attaching to a plurality of contacts of a semiconductor, said apparatus comprising:

an interconnect structure comprising a plurality of conductors patterned to match corresponding ones of said plurality of contacts of said semiconductor; and
an attachment device arranged to press said interconnect structure against said semiconductor to provide an electrical connection between said plurality of conductors and said corresponding ones of said plurality of contacts, said attachment device comprising a spring element including a first conductive member, a first elastic member and a second elastic member, said first elastic member comprising a first elastomeric material having first force transfer characteristics and said second elastic member comprising a second elastomeric material having second force transfer characteristics, said second elastic member being positioned within said first elastic member such that said spring element has overall force transfer characteristics different from said first and second force transfer characteristics.

55. The apparatus of claim 54, further comprising a plurality of said second elastic members formed within said first elastic member.

56. The apparatus of claim 54, wherein said conductive member comprises a plurality of conductive particles.

63. An apparatus for attaching to a plurality of contacts of a semiconductor, said apparatus comprising:

Attorney Docket No. MIO 0020 VA (97-0198.02)
Serial No. - 09/510,828

an interconnect structure comprising a plurality of conductors patterned to match corresponding ones of said plurality of contacts of said semiconductor; and

an attachment device arranged to press said semiconductor against said interconnect structure to provide an electrical connection between said plurality of conductors and said corresponding ones of said plurality of contacts, said attachment device comprising a spring element including a conductive member and an elastic member comprised of an elastomeric material having first force transfer characteristics, said elastic member having at least one cavity formed therein such that said spring element has overall force transfer characteristics different from said first transfer characteristics of said elastomeric material.

64. The apparatus of claim 63, wherein said elastic member has a plurality of cavities formed therein.

65. The apparatus of claim 63, wherein said conductive member comprises a plurality of conductive particles.

68. An apparatus for attaching to a plurality of contacts of a semiconductor, said apparatus comprising:

an interconnect structure comprising a plurality of conductors patterned to match corresponding ones of said plurality of contacts of said semiconductor; and

an attachment device arranged to press said interconnect structure against said semiconductor to provide an electrical connection between said plurality of conductors and said corresponding ones of said plurality of contacts, said attachment device comprising a spring element including a conductive member and an elastic member having a variable spring constant.

Attorney Docket No. MIO 0020 VA (97-0198.02)
Serial No. - 09/510,828

69. The apparatus of claim 68, wherein said conductive member comprises a plurality of conductive particles.

74. The apparatus of claim 44, wherein said conductive member comprises a plurality of conductive particles interspersed within said elastomeric member.

75. The apparatus of claim 44, wherein said semiconductor is electrically biased through said spring element.

76. The apparatus of claim 50, wherein said conductive member comprises a plurality of conductive particles interspersed within said elastomeric member.

77. The apparatus of claim 50, wherein said semiconductor is electrically biased through said spring element.

78. The apparatus of claim 54, wherein said conductive member comprises a plurality of conductive particles interspersed within said elastomeric member.

79. The apparatus of claim 54, wherein said semiconductor is electrically biased through said spring element.

80. The apparatus of claim 63, wherein said conductive member comprises a plurality of conductive particles interspersed within said elastomeric member.

81. The apparatus of claim 63, wherein said semiconductor is electrically biased through said spring element.

82. The apparatus of claim 68, wherein said conductive member comprises a

Attorney Docket No. MIO 0020 VA (97-0198.02)
Serial No. - 09/510,828

plurality of conductive particles interspersed within said elastomeric member.

83. The apparatus of claim 68, wherein said semiconductor is electrically biased through said spring element.

84. The apparatus of claim 68, wherein said spring element includes an elastic member having a cross-section defined by at least one peak, wherein said elastic member exhibits a variable spring constant that changes with a degree of compression of said at least one peak.

85. The apparatus of claim 68, wherein said elastic member has a triangular shaped cross-section.

86. The apparatus of claim 68, wherein said elastic member has a repeating triangular shaped cross-section.

87. The apparatus of claim 68, wherein said elastic member has a diamond shaped cross-section.

88. The apparatus of claim 68, wherein said elastic member has a repeating diamond shaped cross-section.